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| 10/682,057 | 10/09/2003 | Manfred Reinold | 10191/3400 | 8171 |

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| EXAMINER | |
|---|---|
| ABOAGYE, MICHAEL | |

| ART UNIT | PAPER NUMBER |
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| 1793 | |

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| | | |
|---|---|---|
| ***Office Action Summary*** | **Application No.**<br>10/682,057 | **Applicant(s)**<br>REINOLD ET AL. |
| | **Examiner**<br>MICHAEL ABOAGYE | **Art Unit**<br>1793 |

***-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --***

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on _28 August 2008_.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) _1,3-6,10 and 11_ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1,3-6,10 and 11_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _10/09/2003_ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Continued Examination Under 37 CFR 1.114*

**1.** A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on August 28, 2008 has been entered.

### *Claim Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 3-5, 10, and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Tjugino (US Patent No. 6,299,051).

Regarding claims 1, 10 and 11, Tjugino teaches an ultrasonic tool head and a method for attaching a semiconductor flip chip (11, figure 5) onto a contact surface of a substrate (12, figure 5), comprising: a vibration exciter (piezoelectric transducer 17, figure 5) for generating linear ultrasonic vibrations; a bonding tool (bonding tool or welding chip 14) adapted to contact at least one of the contact surface and the semiconductor flip chip (11, figure 5), the contacting applying a contact pressure to the conductor in a direction of the contact surface via the bonding tool, the conductor being adapted to be welded onto the contact surface with the aid of ultrasonic vibrations transmitted to at least one of the contact surface and the conductor; a vibration conductor (oscillation transmission hone 15, figure 5) absorbing the linear ultrasonic vibrations of the vibration exciter (17, figure 5), said vibration conductor laterally secured on a side of the converter so that a center axis of the vibration conductor is oriented perpendicularly to the center axis a converter (see, the composite hone and piezoelectric transducer 16, 18, figure 5, the vertical center axis of the hone 16 is perpendicular to the horizontally oriented center axis of the conductor 15). Note the items 16 and 18 are centered position in/on the bonding tool, therefore (16, 18) are positioned between the conductor 15 and the tip of the bonding tool 14). Said converter is operable in converting linear vibrations into radial vibrations such that the bonding tool is able to be incited to one of radial vibrations and rotary vibrations about a tool axis of rotation, wherein the radial vibrations are torsional vibrations (Note the hones 15 and 16, together with the piezoelectric transducers of Tjugino are characterized such that the oscillation locus can be changed variously into circular and elliptical mode by phase change. Said phase change to redial oscillation locus enhances or ensures excellent bonding between the semiconductor chip and the substrate (see, column 5, lines 47-67), note said circular and elliptical are equivalent to the radial vibrations and therefore constitutes torsional vibrations as recited in the claim. The applicant's disclosed invention and that of Tjugino, are fairly similar in terms of structural features, the arrangement of structures and the workpiece, it is therefore the examiner's position that the bonding device of Tjugino inherently generates linear ultrasonic vibrations in a direction approximately parallel to the contact surface of the substrate. Further more the converter of Tjugino is positioned at a center axis of the converter, aligned and coincident or balanced with the center axis of the vibration conductor.

Regarding claim 3, the tip of the bonding tool of Tjugino coincides with the center axis of the converter (16, 18, figure 5).

Regarding claim 4, Tjugino is silent on the claim recitation, however, it is noted that the applicant's disclosed invention and that of Tjugino, are fairly similar in terms of the structural features (i.e. exciter, conductor, converter and bond tool) and the arrangement of structural features, therefore the converter of Tjugino necessarily coincides with at least one node of vibration and vibration amplitude of the rotary vibrations is zero.

Regarding claim 5, Tjujino in figure 5, shows a vibration conductor (15, figure 5) that projects freely from the converter (16, 18) attached to a bond tool (14).

## *Claim Rejections - 35 USC § 103*

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsujino (US Patent No. 6,299,051) in view of Amador et al. (US Patent No. 5,201,453).

Tjujino teaches an ultrasonic tool head and a method for attaching a semiconductor flip chip (11, figure 5) onto a contact surface of a substrate (12, figure 5), comprising: a vibration exciter (piezoelectric transducer 17, figure 5) for generating linear ultrasonic vibrations; a bonding tool (bonding tool or welding chip 14) adapted to contact at least one of the contact surface and the semiconductor flip chip (11, figure 5), the contacting applying a contact pressure to the conductor in a direction of the contact surface via the bonding tool, the conductor being adapted to be welded onto the contact surface with the aid of ultrasonic vibrations transmitted to at least one of the contact surface and the conductor; a vibration conductor (oscillation transmission hone 15, figure 5) absorbing the linear ultrasonic vibrations of the vibration exciter (17, figure 5), said vibration conductor laterally secured on a side of the converter so that a center axis of the vibration conductor is oriented perpendicularly to the center axis a converter (see, the composite hone and piezoelectric transducer 16, 18, figure 5, the vertical center axis of the hone 16 is perpendicular to the horizontally oriented center axis of the conductor 15). Note the items 16 and 18 are centered position in/on the bonding tool, therefore (16, 18) are positioned between the conductor 15 and the tip of the bonding tool 14). Said converter is operable in converting linear vibrations into radial vibrations such that the bonding tool is able to be incited to one of radial vibrations and rotary vibrations about a tool axis of rotation, wherein the radial vibrations are torsional vibrations (Note the hones 15 and 16, together with the piezoelectric transducers of Tjujino are characterized such that the oscillation locus can be changed variously into circular and elliptical mode by phase change. Said phase change to redial oscillation locus enhances or ensures excellent bonding between the semiconductor chip and the substrate (see, column 5, lines 47-67), note said circular and elliptical are equivalent to the radial vibrations and therefore constitutes torsional vibrations as recited in the claim. The applicant's disclosed invention and that of Tjujino, are fairly similar in terms of structural features, the arrangement of structures and the workpiece, it is therefore the examiner's position that the bonding device of Tjujino inherently generates linear ultrasonic vibrations in a direction approximately parallel to the contact surface of the substrate. Further more the converter of Tjujino is positioned at a center axis of the converter, aligned and coincident or balanced with the center axis of the vibration conductor.

Tsujino fails to teach a converter or a transducer having a bore or channel for wire or conductor feedthrough to the bonding tool.

Amador et al. teaches a wire bonding device having a first transducer (24, figures 2 and 3) and a second transducer (25, figures 2 and 3, note this second transducer is functionally equivalent to the converter set forth in the claims); said second transducer is arranged between the first transducer and the bonding tool; wherein said second transducer is provided with a bore or channel for wire or conductor feedthrough to the bonding tool (See, Amador et al., abstract and column 2, line 45- column 3, line 25). Though Amador teaches an ultrasonic wire bonder having a bonding tip in a form of a capillary with a wire feed channel, whilst Tsujino teaches an ultrasonic ball or bump bonder with a solid bonding tip, these bonders are obvious variation of ultrasonic bonders known in the art and any of such tips could be utilized on the same ultrasonic bonding device depending on whether wire bonding or ball or bump bonding is required.

It would have been obvious to one of ordinary skill in the art at the time the applicant's invention was made to recognize the need to substitute the solid mass bonding tip of Tsujino with the capillary type bonding tip of Amador et al. if wire bonding is required or desire, since these bonders are obvious variation of ultrasonic bonders known in the art (See, Amador et al., abstract and column 2, line 45- column 3, line 25).

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Macabitas et al. (US 5944249), Jones (US 3257721), Shannon et al. (US 6120629), Kyomasu et al. (US 6422448), Jang (US 5699950) and Gopalakrishna et al. (US 5645681) are also cited in PTO-892.

## *Response to Arguments*

7. The examiner acknowledges the applicants' amendment received by USPTO on August 28, 2008. Claims 1, 3-6, 10 and 11 are currently under consideration in the application.

8. Applicant's arguments with respect to claims 1, 3-6, 10 and 11 have been considered but are moot in view of the new ground(s) of rejection.

## *Conclusion*

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL ABOAGYE whose telephone number is (571)272-8165. The examiner can normally be reached on Mon - Fri 8:30am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jessica Ward can be reached on 571-272-1223. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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